

ABSTRACT

A group of Double-Sided High- T_c Superconducting (HTS) Magnetic-Dipole Micro-Antennas is provided. The multi-resonant double-sided HTS magnetic dipole
5 micro-antenna are fabricated using thin-film ($\tau_{\text{YBCO}} \approx 3000\text{\AA}$) YBCO material (with $T_c \approx 92\text{ K}$). The substrate is a single LaAlO_3 crystal (with the loss-tangent of $\tan\delta \approx 10^{-5}$, $\epsilon_r \approx 24$) with the thickness of $\tau_{\text{LAO}} \approx 508\mu\text{m}$. Each antenna is comprised of a combination of co-centric loop and spiral structures, patterned on both sides of the substrate without ground plane. Due to their geometric structures, each antenna demonstrates a multi-
10 resonant characteristic. The comparison between the overall dimensions of the device ($22 \times 22\text{ mm}^2$) and variation of the wavelength at resonances indicate a typical ratio of $D/\lambda \approx 10^{-2}$ between the largest loop diameter and the longest wavelength. A multi-resonant double-sided spiral HTS magnetic dipole micro-antenna, a multi-resonant double-sided folded log-periodic HTS magnetic dipole micro-antenna and methods for reducing
15 antenna length with a multi-resonant double-sided HTS magnetic dipole micro-antenna are also provided.